

Trend Study 10R-22-00

Study site name: Rathole Ridge.

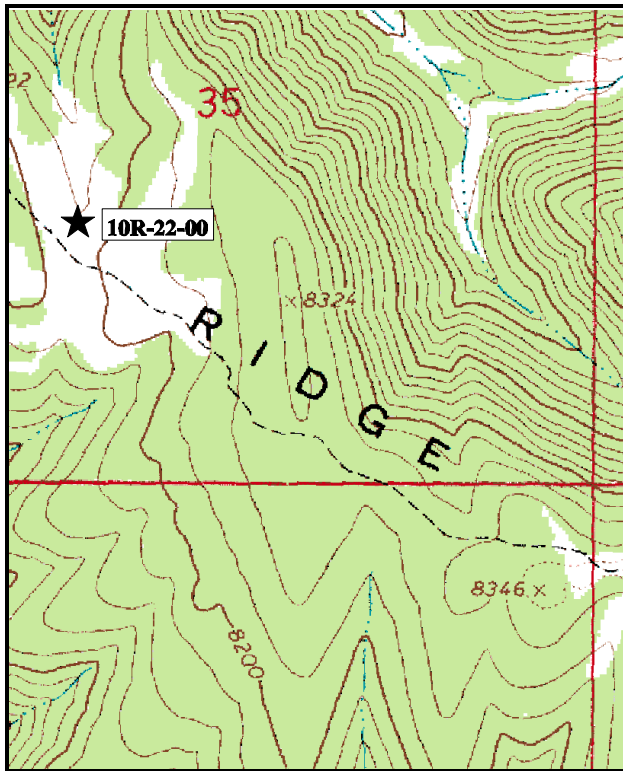
Range type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 336°M.

Footmark (first frame placement) 5 feet, footmarks (frequency belts) line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft) line 5 (95 ft).

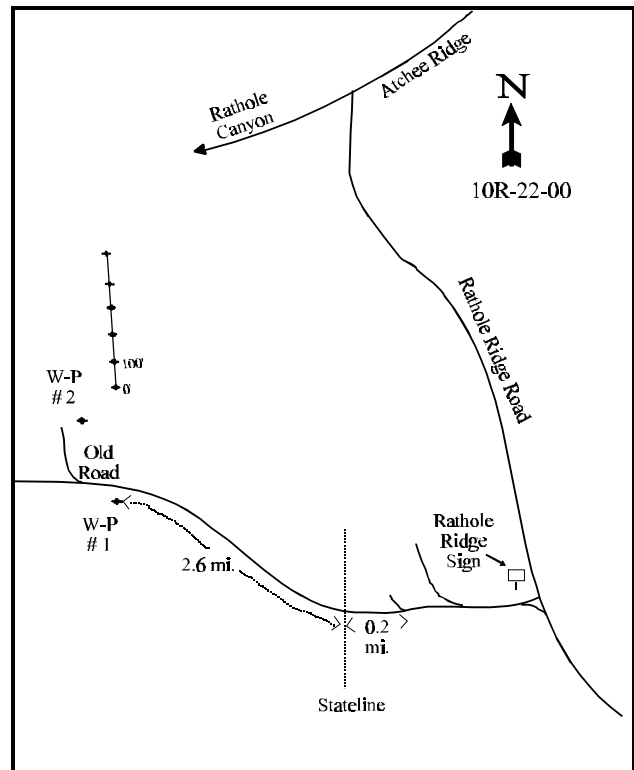
LOCATION DESCRIPTION

From the Junction of Atchee Ridge Road, Rathole Canyon and Rathole Ridge Road follow Rathole Ridge Road up to the a sign pointing to Rathole Ridge. Take this road to the first fork. Take a left at the fork and continue down the canyon 0.2 miles to the state line. Continue 2.6 miles down (staying left) to a witness post on the left side of the road. Just past the witness post an old road breaks off to the right follow it about 500' to another witness post on the right side of the road. From this second witness post the 0' stake is 15 paces at 55°M and is marked with browse tag #111.



Map name: Rathole Ridge

Township 14 S, Range 25 E, Section 35.



Diagrammatic Sketch

UTM 4379807.985 N, 664253.380 E

DISCUSSION

Trend Study No. 10R-22

The Rathole Ridge study was established in 1998 to monitor perceived conflicts over elk and livestock use in the North Bookcliffs. This site has a west aspect with a slope of 3-5% at 7,900 feet in elevation. Pellet group transect data in 1998 estimated one deer days use/acre (2 ddu/ha), 27 elk days use/acre (67 edu/ha), and eight cow days use/acre (20 cdu/ha). A prescribed burn was completed in the fall of 1998 to reduce sagebrush cover and increase herbaceous vegetation. Pellet group transect data in 2000 estimated similar levels of use with two deer days/acre (5 ddu/ha), 33 elk days use/acre (82 edu/ha), and one cow days use/acre (2 cdu/ha). This area is within the Atchee Ridge allotment which permits cattle grazing from June through September on a deferred rest rotation basis.

Soils are loamy in texture with an average temperature of 61°F at nearly 14 inches in depth. Soil reaction is slightly acidic (pH of 6.3). With very little rock actually being sampled within the profile, the stoniness index is more a measure of compaction than rockiness. Soil depth is moderately shallow with an estimated effective rooting depth of just over 12 inches. Vegetation and litter were abundant in 1998 contributing 62% and 58% average cover. In 2000, vegetation and litter cover both decreased, mainly due to the decrease in browse following the prescribed burn. As a result, percent cover from bare ground doubled in 2000. However, 87% of the vegetative cover in 2000 comes from herbaceous species keeping erosion at a minimal level.

In 1998, browse was abundant contributing over 25% average cover. Mountain big sagebrush was the dominant species providing 86% of the browse cover. However as this is summer range, browse is not the key vegetative component and the dense stand of mountain big sagebrush needed to be reduced to improve the understory and favor other more preferred browse species such as bitterbrush and serviceberry. The prescribed burn completed in the fall of 1998 did this. Browse cover was reduced to only 5% in 2000. Mountain big sagebrush was greatly reduced as it provided 21% cover before the treatment and only 2% when the site was read in 2000 following the burn. Mountain big sagebrush density was estimated at 4,060 plants/acre in 1998, decreasing to 540 plants/acre following the treatment. In 2000, recruitment from young plants was high at 30% with mature plants comprising 48% of the population. Percent decadency is 22% with most of these being burned plants that were not killed in the burn treatment. The prescribed burn was not very hot as many of the burned sagebrush skeletons were still standing when the site was reread in 2000. However, this was advantageous for other browse such as bitterbrush which are usually not very fire tolerant and were resprouting. Bitterbrush increased in density following the prescribed burn due to young plants, increasing from 40 plants/acre in 1998 to 120 plants/acre in 2000. Snowberry increased in density following the prescribed burn from 1,200 to 1,640 plants/acre. This increase is also due to the young age class which increased from 620 to 1,400 plants/acre in 2000, a recruitment rate of 85%. Serviceberry, a fire tolerant species, increased in 2000 with the young age class doubling from 80 to 160 plants/acre. All of the browse species show good vigor and light use in 2000.

Herbaceous vegetation is the dominant and key component at the Rathole Ridge transect. Currently, average cover from grasses and forbs is nearly the same in 1998, however they did increase in abundance (sum of nested frequency). Grasses are diverse and abundant with 11 perennial species being sampled between the 1998 and 2000 readings. Needle-and-thread, Kentucky bluegrass, and thickspike wheatgrass are the most abundant. Other moderately abundant species include: *Carex spp.*, subalpine needlegrass, mutton bluegrass, prairie junegrass, and mountain brome. Grasses had increased sum of nested frequency values in 2000. They had good stature and vigor as Kentucky bluegrass, needle-and-thread, and subalpine needlegrass had heights of more than one foot. Most grasses have moderate seed production and did not appear to be utilized when the site was read in June 2000. Forbs are very diverse with a good composition. Increasers are present but not dominant, with many abundant preferred forage species. The forb component is key on this site as they provide important

forage for deer and elk in the spring and summer. Some of the *Penstemon* species were noted as having been utilized in 2000. Perennial forbs increased in sum of nested frequency by nearly 20% in 2000.

1998 APPARENT TREND ASSESSMENT

Soils appear stable. There is no apparent erosion due to the gentle slope and the abundance of protective ground cover from vegetation and litter. Browse is abundant, especially mountain big sagebrush. As this is transitional/summer range, browse is not the critical component and a prescribed burn is planned to reduce sagebrush density and cover and increase herbaceous species. Herbaceous trend appears stable with a diverse understory of both perennial grasses and forbs. With the planned prescribed burn, herbaceous vegetation should increase and would become a more important key component for this site.

2000 TREND ASSESSMENT

Soil trend is still considered stable even though vegetation and litter cover decreased and bare ground increased. This is because there is still abundant protective ground cover and most of the decrease in vegetation and litter cover is due to the reduction of mountain big sagebrush cover. Herbaceous vegetation provides nearly as much cover as before the burn and it has increased in sum of nested frequency following the burn. Trend for browse is slightly up overall as mountain big sagebrush no longer dominates the site and the more preferred species such as serviceberry and bitterbrush are resprouting and have high recruitment from young plants. Trend for the herbaceous understory is up as perennial species, especially forbs, increased in sum of nested frequency in 2000. Composition of the understory is good with many good forage species present.

TREND ASSESSMENT

soil - stable (3)

browse - slightly up (4)

herbaceous understory - up (5)

HERBACEOUS TRENDS --

Herd unit 10R, Study no: 22

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
G	Agropyron dasystachyum	184	222	57	74	1.97	3.22
G	Bouteloua gracilis	-	1	-	1	-	.03
G	Bromus carinatus	29	*5	11	2	.35	.06
G	Bromus tectorum (a)	2	-	1	-	.03	-
G	Carex spp.	3	*54	1	20	.03	.73
G	Koeleria cristata	42	36	15	15	.52	.37
G	Poa fendleriana	69	43	25	17	1.45	.95
G	Poa nevadensis	-	*14	-	7	-	.19
G	Poa pratensis	156	162	40	44	6.88	3.09
G	Sitanion hystrix	13	*-	4	-	.10	-
G	Stipa columbiana	15	*76	7	32	.30	1.12
G	Stipa comata	183	*137	57	41	6.68	5.70

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
	Total for Annual Grasses	2	0	1	0	0.03	0
	Total for Perennial Grasses	694	750	217	253	18.30	15.47
	Total for Grasses	696	750	218	253	18.34	15.47
F	Achillea millefolium	18	25	7	9	.19	.55
F	Agoseris glauca	-	*41	-	21	-	.22
F	Alyssum alyssoides (a)	-	1	-	1	-	.00
F	Antennaria rosea	27	21	10	8	.73	.55
F	Androsace septentrionalis (a)	11	*-	4	-	.07	-
F	Arabis spp.	8	-	3	-	.04	-
F	Arenaria congesta	227	209	74	66	3.19	4.18
F	Astragalus convallarius	13	33	7	14	.22	.27
F	Astragalus miser	155	168	59	65	6.25	5.81
F	Aster spp.	-	*45	-	16	-	.59
F	Castilleja flava	97	82	38	34	2.02	1.60
F	Calochortus nuttallii	3	-	1	-	.03	-
F	Crepis acuminata	100	125	45	50	1.42	1.70
F	Delphinium bicolor	4	-	2	-	.01	-
F	Draba spp. (a)	1	1	1	1	.03	.00
F	Erigeron spp.	12	*39	6	17	.05	.18
F	Eriogonum spp.	2	-	1	-	.00	-
F	Eriogonum umbellatum	25	*8	12	4	.55	.12
F	Gayophytum ramosissimum (a)	-	1	-	1	-	.00
F	Geranium richardsonii	36	52	18	23	1.82	1.22
F	Hackelia patens	1	*21	1	9	.00	.09
F	Lupinus argenteus	28	29	12	14	1.16	1.00
F	Penstemon caespitosus	18	27	7	10	.37	.34
F	Penstemon watsonii	64	58	28	28	1.56	.98
F	Phlox longifolia	15	*46	5	20	.05	.14
F	Polygonum douglasii (a)	44	2	14	1	.36	.00
F	Potentilla gracilis	-	14	-	5	-	.97
F	Potentilla pennsylvanica	19	27	10	9	.87	.76
F	Senecio multilobatus	5	*-	4	-	.04	-
F	Taraxacum officinale	15	29	7	11	.19	.21
F	Thalictrum fendleri	-	1	-	1	-	.00
F	Tragopogon dubius	2	3	1	1	.00	.00
F	Viguiera multiflora	9	-	3	-	.33	-

T y p e	Species	Nested Frequency		Quadrat Frequency		Average Cover %	
		'98	'00	'98	'00	'98	'00
	Total for Annual Forbs	56	5	19	4	0.46	0.01
	Total for Perennial Forbs	903	1103	361	435	21.16	21.56
	Total for Forbs	959	1108	380	439	21.62	21.58

* Indicates significant difference at % = 0.10

BROWSE TRENDS --

Herd unit 10R, Study no: 22

T y p e	Species	Strip Frequency		Average Cover %	
		'98	'00	'98	'00
B	Amelanchier utahensis	6	8	.78	.56
B	Artemisia tridentata vaseyana	88	10	21.83	2.33
B	Chrysothamnus viscidiflorus viscidiflorus	19	17	.70	.19
B	Juniperus osteosperma	1	1	-	-
B	Purshia tridentata	2	3	.03	.06
B	Quercus gambelii	0	1	-	.15
B	Symphoricarpos oreophilus	23	23	1.93	2.03
B	Tetradymia canescens	4	5	.06	.03
	Total for Browse	143	68	25.34	5.37

BASIC COVER --

Herd unit 10R, Study no: 22

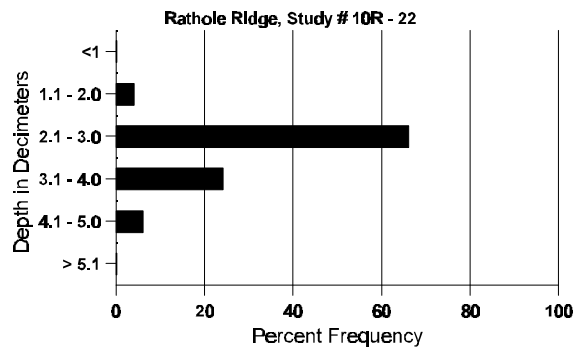
Cover Type	Nested Frequency		Average Cover %	
	'98	'00	'98	'00
Vegetation	465	460	62.92	46.29
Rock	24	25	.14	.24
Pavement	31	77	.33	.34
Litter	491	454	58.79	50.99
Cryptogams	45	8	.98	.07
Bare Ground	213	356	14.93	28.55

SOIL ANALYSIS DATA --

Herd Unit 10R, Study # 22, Study Name: Rathole Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	% sand	% silt	% clay	% OM	PPM P	PPM K	dS/m
12.4	61.4 (13.7)	6.3	40.0	37.4	22.6	3.6	12.0	124.8	.9

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 10R, Study no: 22

Type	Quadrat Frequency	
	'98	'00
Rabbit	-	2
Elk	14	34
Deer	-	8
Cattle	8	-

Pellet Transect			
Pellet Groups per Acre		Days Use per Acre (ha)	
'98	'00	'98	'00
-	35	-	N/A
357	426	27 (68)	33 (81)
17	26	1 (3)	2 (5)
96	9	8 (20)	1 (2)

BROWSE CHARACTERISTICS --

Herd unit 10R, Study no: 22

Treatment Unit FOR, Study No: 22																		
A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier utahensis																		
Y	98	2	-	-	2	-	-	-	-	-	4	-	-	-	80			4
	00	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
M	98	-	5	-	-	-	-	-	-	-	4	1	-	-	100	66	50	5
	00	1	-	-	-	-	-	2	-	-	3	-	-	-	60	63	55	3
D	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	1	-	-	-	-	1	-	-	-	20			1
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		56%			00%			00%			+25%							
'00		08%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'98	180	Dec:	0%	
														'00	240		8%	
Artemisia tridentata vaseyana																		
S	98	26	-	-	-	-	-	-	-	-	26	-	-	-	520			26
	00	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	98	39	1	-	-	-	-	-	-	-	40	-	-	-	800			40
	00	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
M	98	132	2	3	3	-	-	-	-	-	140	-	-	-	2800	35	45	140
	00	12	1	-	-	-	-	-	-	-	13	-	-	-	260	27	27	13
D	98	21	-	2	-	-	-	-	-	-	10	-	-	13	460			23
	00	4	2	-	-	-	-	-	-	-	6	-	-	-	120			6
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	680			34
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	3760			188
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		01%			02%			06%			-87%							
'00		11%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'98	4060	Dec:	11%	
														'00	540		22%	
Atriplex canescens																		
M	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14	-	0
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'98	0	Dec:	-	
														'00	0		-	

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus depressus																		
M	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2	10	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	0	Dec:	-			
												'00	0		-			
Chrysothamnus viscidiflorus viscidiflorus																		
Y	98	9	-	-	2	-	-	-	-	-	11	-	-	-	220		11	
	00	11	-	-	-	-	2	-	-	-	13	-	-	-	260		13	
M	98	28	-	-	7	-	-	-	-	-	35	-	-	-	700	13	16	
	00	27	-	-	1	-	-	-	-	-	28	-	-	-	560	9	10	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%			-11%							
'00		00%			05%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	920	Dec:	-			
												'00	820		-			
Juniperus osteosperma																		
D	98	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			100%			+ 0%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	20	Dec:	100%			
												'00	20		100%			
Purshia tridentata																		
Y	98	-	-	-	1	1	-	-	-	-	2	-	-	-	40		2	
	00	6	-	-	-	-	-	-	-	-	6	-	-	-	120		6	
M	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20	22	62	
	00	1	-	-	-	-	-	-	-	-	1	-	-	-	20	14	26	
X	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	100		5	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		33%			00%			00%			+57%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'98	60	Dec:	-			
												'00	140		-			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Quercus gambelii																		
Y	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	00	-	-	-	3	-	-	-	-	-	3	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%										
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'98	0	Dec:	-	
														'00	60		-	
Symphoricarpos oreophilus																		
S	98	2	-	-	3	-	-	-	-	-	5	-	-	-	100		5	
	00	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	98	18	1	-	12	-	-	-	-	-	31	-	-	-	620		31	
	00	70	-	-	-	-	-	-	-	-	70	-	-	-	1400		70	
M	98	10	11	-	8	-	-	-	-	-	29	-	-	-	580	19 32	29	
	00	3	-	-	9	-	-	-	-	-	12	-	-	-	240	13 18	12	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		20%			00%			00%			+27%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'98	1200	Dec:	-	
														'00	1640		-	
Tetradymia canescens																		
Y	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100		5	
	00	8	-	-	-	-	-	-	-	-	8	-	-	-	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'98		00%			00%			00%			+38%							
'00		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)														'98	100	Dec:	-	
														'00	160		-	